EXPLORING RISK ASSOCIATED TO PUBLIC INFRASTRUCTURE PROJECTS

CASE STUDY OF KUALA TERENGGANU BY PASS

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STUDENT'S DECLARATION

I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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ABSTRAK

Kajian ini mencadangkan kajian empirikal modul penilaian risiko untuk projek pembinaan jalan awam. Kajian ini menggunakan satu kajian kes projek pembinaan jalan konvensional untuk Bypass Kuala Terengganu yang telah dimulakan oleh Kementerian Kerja Raya Malaysia sejak Julai 2016. Projek-projek ini melibatkan pembinaan laluan 5.875km dari laluan Tok Molor, Jalan Tok Adis T12) ke Kampng Durian Burung di laluan Persekutuan (FT03) Kota Bharu-Kuala Terengganu. Tujuh faktor kelewatan dan dua puluh dua sub-faktor telah ditetapkan daripada semakan kesusasteraan dan perundingan dengan pakar jalan awam. Survei soal selidik yang sepatutnya dijodohkan kepada pasukan projek jalan raya mengikut teknik Analitik Hierarki Proses (AHP). Risiko penangguhan dinilai secara kuantitatif dengan mengutamakan faktor kelewatan risiko dalam menentukan fasa pembinaan kritikal.

Kajian ini mengenal pasti lima faktor utama yang paling utama seperti berikut: bahawa faktor risiko paling utama dalam projek infrastruktur yang berkaitan dengan matlamat adalah risiko projek (0.34834), diikuti oleh risiko operasi (0.30861), risiko alam sekitar (0.23276), dan risiko teknikal 0.11029). Wajaran sub-faktor juga disenaraikan dan lima sub-faktor utama akan dibincangkan selanjutnya. Jadual 4 menunjukkan ketidakpastian cuaca (0.73289) sebagai risiko teratas yang utama yang menyebabkan sebahagian besar projek penangguhan, diikuti oleh isu pemilikan tanah (0.55465), penyerahan lewat yang diluluskan untuk lukisan pembinaan menyebabkan kelewatan dalam kelewatan penghantaran projek (0.39605), reka bentuk baru tidak menganggap sistem saliran yang sedia ada menyebabkan banjir (0.35202), dan keadaan tanah yang tidak dijangka (0.30084).

ABSTRACT

This study proposed an empirical study of risk assessment module for public road construction projects. This study employs a case study of a conventional road construction projects for Bypass Kuala Terengganu that has been initiated by the Ministry of Works Malaysia since July 2016. The projects involve the construction of 5.875km route from the state route Tok Molor, Jalan Tok Adis (T12) to Kampng Durian Burung at Federal route (FT03) Kota Bharu-Kuala Terengganu. Seven delay factors and twenty-two sub-factors were designated from a review of literature and consultations with public road experts. The designate pair-wise questionnaire survey was distributed to the road project team in accordance with the Analytic Hierarchy Process (AHP) technique. The delay risk was assessed quantitatively by prioritizing the risk delay factors in determining the critical construction phase.

This study identified the top five most prioritized factors as follows: that the most prioritised risk factor in infrastructure projects with respect to goal is technical risk (0.11029), followed by environmental risk (0.23276), project risk (0.34834), and operational is (0.30861). The sub-factors weights were also ranked and the top five sub-factors will be further discussed. The table 4 shows uncertainty of weather (0.73289) as the top risk which is the main caused most of the delay project, followed by land acquisition issues (0.55465), late submission of approved for construction drawing causing delay in in project submission delay (0.39605), the new design does not consider existing drainage system causing flood (0.35202), and unexpected ground condition (0.30084). Therefore, the AHP method can be identified by classification weighted of the most prioritize risk in this project.

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LIST OF ABBREVIATIONS

AHP	Analytical Hierarchy Process
ANP	Analytical Network Process
CI	Consistency Index
CR	Consistency Ratio
MCDM	Multi-Criteria Decision Making
RI	Random Index

CHAPTER 1

INTRODUCTION

1.1 Introduction

Economic growth is the most important entity in improving the income and living standards of the people. Thus, the balance between economic growth and economic prosperity, social and political population must be taken seriously to ensure the development of the country. The National mission was launched simultaneously with the Ninth Malaysia Plan 2006-2009. The aim is to achieve a stronger national economy while the government strives to achieve balanced and quality development. To achieve the balance development, it is requiring policy and strategy in the economy of the state. In Malaysia policies and strategies towards creating a more balanced economic development have long been emphasized.

The construction industry is an important component in the economic growth of our country in line with the sectors of agriculture, mining, manufacturing and services. The economic crisis in mid-1997 has led to the construction sector was hit hard and the heat is still felt today. Generally, recognizing the risk as an element that must be faced by each party in the development of the project, then it should be dealt with effectively. Furthermore, risks can be expressed as something that is not certain to happen and, in the event, that it can lead to loss or damage. In the context of construction, the risks inherent in the industry cannot be eliminated, but once it can be minimized or transferred to another party (Roozbeh, 1995).

In 1995, Roozbeh stated that, risk management in a construction company is important as it can influence the decisions made. Thus, to ensure the success of the project, many factors need to be assessed before making any decisions quickly and accurately. Such as costs, profits, management and finance.

Most infrastructure expenditure in developing countries has been funded directly from the fiscal budgets. However, several factors such as macroeconomic instability and growing investment requirements (particularly following the debt crisis of the 1980s), have shown that public financing is volatile and, in many countries, rarely meets crucial infrastructure expenditure requirements in a timely and adequate manner("Public Private Partnerships - Risk Management in Engineering Infrastructure Projects" 2005).

Infrastructure is understood to be a critical factor in the health and wealth of a country, enabling private businesses and individuals to produce goods and services more efficiently. With respect to overall economic output, increased infrastructure spending by the government is generally expected to result in higher economic output in the short term by stimulating demand and in the long term by increasing overall productivity. The short-term impact on economic output largely depends on the type of financing (whether deficit financed or deficit neutral) and the state of the economy (whether in a recession or expansion). The long-term impact on economic output is also affected by the method of financing, due to the potential for "crowding out" of private investment when investments are deficit financed. The type of infrastructure is also expected to affect the impact on economic output. Investments in core infrastructure, defined as roads, railways, airports, and utilities, are expected to produce larger gains in economic output than investments in some broader types of infrastructure, such as hospitals, schools, and other public buildings.(Stupak 2018)

Construction projects can be managed using various risk management tools and techniques. Ahmed et al. reviewed techniques that can be used for development of risk management tools for engineering projects. Techniques for context establishment, risk identification, risk assessment and treatment were provided. Application of risk management tools depends on the nature of the project, organization's policy, project management strategy, risk attitude of the project team members, and availability of the re-sources. A risk assessor model (RAM) presented by Jannadi and Almishari was developed to determine risk scores for various construction activities. The model provides an acceptability level for the risks and determines a quantitative justification for the proposed remedy.(Singh 2016)

Thus, government in RMK 9 propose a PPP for residence starter at KL, with various affordable housing introduce by the government such as PR1ma, PPA1M, PPRT, etc there is ambiguous in the implementation of the program. Various proposals have yet to meet high demand for housing. In addition, various risks had occurred even though the construction promises of high market value.

1.2 Problem Statement

This study attempts to explore of risk response plan associated to public infrastructure projects First, a framework for risk management is proposed based on a literature review. In some projects especially, mega infrastructure projects are usually vulnerable to risks due to several reasons such as delay in project, cost overrun, and higher costs. Many risks in infrastructure projects are very difficult to be precisely assessed due to large project scales and long durations. For instance, underestimation of demand shortfall is quite normal in traffic projects (Cruz & Marques, 2013b). Moreover, stakeholders could overestimate their capability of taking risks. The risk appetite of the project manager determines the risk transfer from the government (Kwak & LaPlace, 2005).(Ex Post Risk Management inXiong 2017). In the bidding documents, an inappropriate or excess transfer of risk to contractors might reduce the number of bidders and foster opportunism of the remaining tenderers. One of the most popular opportunistic behaviours is that the contractor wins the bid with a low price and then forces favourable renegotiations after the contract has been signed.

1.3 Research Question

i) What is the risk associated in a public infrastructure project?

ii) What are the measured tools for mitigation of risk public infrastructure project.

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